

S. Okamoto et al.  
U.S. Serial No. 09/835,194  
Page 2 of 12

**Amendments to the claims:**

This listing of claims will replace all prior versions, and listings, of claims in the application:

**Listing of claims:**

Claim 1 (currently amended): An image reproducing method for reproducing an image by a display apparatus having a plurality of pixels based on a picture signal including a pixel signal representing information of each pixel, comprising the steps of:

performing an operation to obtain an average signal level which is an average level of all the pixel signals, then, setting an input signal-output brightness property which represents variations in brightness of a pixel with respect to the level of a pixel signal in accordance with the average signal level;

reproducing an image so that an exponential value of an exponential function approximately representing the input signal-output brightness property thus set increases with an increase of the average signal level; and

reproducing the image so that maximum output brightness of a pixel of the display apparatus varies in accordance with the average signal level, wherein the image is reproduced so that the maximum output brightness becomes smaller as the average signal level increases, and the maximum output brightness is independent of gamma compensation calculated by the exponential function,

wherein the image is reproduced by performing an operation to obtain the maximum output brightness of a pixel of the display apparatus from the average signal level, performing compensation of the picture signal subject to compensation in accordance with the input signal-output brightness property thus set based on a result of the operation to obtain the maximum output brightness, and feeding the display apparatus with the picture signal subject to compensation.

Claim 2 (canceled)

S. Okamoto et al.  
U.S. Serial No. 09/835,194  
Page 3 of 12

Claim 3 (original): The method as set forth in claim 1, wherein:

when the pixel signal includes a brightness signal representing brightness information of each pixel, the average signal level is obtained by performing an operation to obtain an average level of all the brightness signals.

Claim 4 (original): The method as set forth in claim 3, wherein:

in order to reproduce the image based on the picture signal including a brightness signal subject to compensation, the input signal-output brightness property which represents variations in brightness of a pixel with respect to the level of the brightness signal is set in accordance with the average signal level, and compensation is performed on the brightness signal so as to satisfy the input signal-output brightness property thus set.

Claim 5 (original): The method as set forth in claim 1, wherein:

the image is reproduced by performing compensation on the picture signal so as to satisfy the input signal-output brightness property that is set, and outputting the picture signal subject to compensation to the display apparatus.

Claim 6 (previously presented): The method as set forth in claim 5, wherein:

the input signal-output brightness property is set by performing an operation to obtain an exponential value in which the input signal-output brightness property is approximately represented by an exponential function from the average signal level, and

compensation for the picture signal is made by performing compensation of the picture signal according to an input signal-output brightness property corresponding to the input signal-output brightness property that is set by the operation based on the exponential value, thereafter compensating for deviation from a linear property of the input signal-output brightness property of the display apparatus.

Claim 7 (original): The method as set forth in claim 6, wherein:

the compensation for deviation from the linear property of the input signal-output brightness property of the display apparatus is performed by converting the pixel signal by an

S. Okamoto et al.  
U.S. Serial No. 09/835,194  
Page 4 of 12

inverse function of a function which represents the input signal-output brightness property of the display apparatus.

Claim 8 (original): The method as set forth in claim 1, wherein:

the picture signal to be employed in the operation for the average signal level is a color video signal including a brightness signal which represents brightness information of each pixel and a chromaticity signal which represents chromaticity information of each pixel.

Claim 9 (original): The method as set forth in claim 1, wherein:

the picture signal to be employed in the operation for the average signal level is a color video signal including color component signals of three or more primary colors.

Claims 10-12 (canceled)

Claim 13 (previously presented): The method as set forth in claim 1, wherein:

as the display apparatus is adopted a display apparatus having an emission type optical switching element in which an emission element functions as an optical switching element as well.

Claim 14 (canceled)

Claim 15 (previously presented): The method as set forth in claim 1, wherein:

when the pixel signal includes a brightness signal which represents brightness information of each pixel, the operation for the average signal level is made by performing an operation to obtain an average level of all the brightness signals.

Claims 16-20 (canceled)

S. Okamoto et al.  
U.S. Serial No. 09/835,194  
Page 5 of 12

Claim 21 (previously presented): The method as set forth in claim 1, wherein:

as the display apparatus is adopted a display apparatus having an emission element and a non-emission type optical switching element, which is capable of separately controlling the emission element and the optical switching element.

Claim 22 (currently amended): An image display apparatus which includes a display section having a plurality of pixels for displaying an image and receives a picture signal including a pixel signal representing information of each pixel, comprising:

an average signal level operation section for performing an operation to obtain an average signal level which is an average level of all the pixel signals;

an input signal-output brightness property setting section for setting an input signal-output brightness property which represents variations in brightness of a pixel with respect to a level of the pixel signal in accordance with the average signal level;

a maximum output brightness adjustment section for adjusting maximum output brightness of the pixel of the display section in accordance with the average signal level;

a signal compensation section for performing compensation of a picture signal so as to satisfy the input signal-output brightness property thus set; and

a signal conversion section for converting a picture signal subject to compensation in the signal compensation section based on an operational result of the maximum output brightness, so as to output the picture signal subject to conversion to the display apparatus,

wherein:

the input signal-output brightness property setting section sets the input signal-output brightness property by performing an operation based on the average signal level so that an exponential value of an exponential function approximately representing the input signal-output brightness property increases with an increase of the average signal level;

the maximum output brightness adjustment section adjusts the maximum output brightness so that the maximum output brightness becomes smaller as the average signal level increases, and the maximum output brightness is independent of gamma compensation calculated by the exponential function;

S. Okamoto et al.  
U.S. Serial No. 09/835,194  
Page 6 of 12

the signal compensation section includes: a first signal compensation section for performing compensation of the pixel signal by the input signal-output brightness property corresponding to the input signal-output brightness property that is set by the operation based on the exponential value, and a second signal compensation section for compensating for deviation from a linear property of the input signal-output brightness property of the display section; and each pixel signal to be employed in operation of the average signal level operation section is a color video signal which includes a brightness signal representing brightness information of each pixel and a chromaticity signal representing chromaticity information of each pixel.

Claim 23 (canceled)

Claim 24 (original): The image display apparatus as set forth in claim 22, wherein:

the average signal level operation section performs an operation to obtain an average signal level which is an average level of all the brightness signals each of which is included in the picture signal to be inputted and represents brightness information of each pixel.

Claim 25 (original): The image display apparatus as set forth in claim 24, wherein:

the input signal-output brightness property setting section sets an input signal of brightness-output brightness property which represents variations in brightness of a pixel with respect to a level of the brightness signal in the pixel signal in accordance with the average signal level, and the signal compensation section performs compensation of the picture signal so as to satisfy the input signal of brightness-output brightness property thus set.

Claim 26 (original): The image display apparatus as set forth in claim 22, further comprising:

a delay section for delaying output of the pixel signal of the inputted picture signal to the signal compensation section by time required to perform the operation for the average signal level and to set the input signal-output brightness property.

Claim 27 (canceled)

S. Okamoto et al.  
U.S. Serial No. 09/835,194  
Page 7 of 12

Claim 28 (previously presented): The image display apparatus as set forth in claim 22, wherein:  
the second signal compensation section converts the pixel signal by an inverse function  
of a function representing the input signal-output brightness property of the display section.

Claim 29 (canceled)

Claim 30 (original): The image display apparatus as set forth in claim 22, wherein:  
the picture signal to be employed in the operation for the average signal level is a color  
video signal including color component signals of three or more primary colors.

Claims 31-33 (canceled)

Claim 34 (previously presented): The image display apparatus as set forth in claim 22, further  
comprising:  
an emission type optical switching element in which an emission element functions as an  
optical switching element as well.

Claims 35-40 (canceled)

Claim 41 (previously presented): The image display apparatus as set forth in claim 22, further  
comprising an emission element and a non-emission type optical switching element, which are  
separately controlled.

Claim 42 (currently amended): A picture signal compensation device which receives a picture  
signal including a pixel signal representing information of each pixel, and performs  
compensation of the picture signal so as to output the picture signal subject to compensation to a  
display apparatus having a plurality of pixels, comprising:  
an average signal level operation section for performing an operation to obtain an average  
signal level which is an average level of all the pixel signals;

S. Okamoto et al.  
U.S. Serial No. 09/835,194  
Page 8 of 12

an input signal-output brightness property setting section for setting an input signal-output brightness property which represents variations in brightness of a pixel with respect to a level of the pixel signal in accordance with the average signal level;

a maximum output brightness adjustment section for adjusting maximum output brightness of the pixel of the display section in accordance with the average signal level;

a signal compensation section for performing compensation of a picture signal so as to satisfy the input signal-output brightness property thus set; and

a signal conversion section for converting a picture signal subject to compensation in the signal compensation section based on an operational result of the maximum output brightness, so as to output the picture signal subject to conversion to the display apparatus,

wherein:

the input signal-output brightness property setting section sets the input signal-output brightness property by performing an operation based on the average signal level so that an exponential value of an exponential function approximately representing the input signal-output brightness property increases with an increase of the average signal level;

the maximum output brightness adjustment section adjusts the maximum output brightness so that the maximum output brightness becomes smaller as the average signal level increases, and the maximum output brightness is independent of gamma compensation calculated by the exponential function;

the signal compensation section includes: a first signal compensation section for performing compensation of the pixel signal by the input signal-output brightness property corresponding to the input signal-output brightness property that is set by the operation based on the exponential value, and a second signal compensation section for compensating for deviation from a linear property of the input signal-output brightness property of the display section; and

each pixel signal to be employed in operation of the average signal level operation section is a color video signal which includes a brightness signal representing brightness information of each pixel and a chromaticity signal representing chromaticity information of each pixel.

Claim 43 (canceled)

S. Okamoto et al.  
U.S. Serial No. 09/835,194  
Page 9 of 12

Claim 44 (original): The picture signal compensation device as set forth in claim 42, wherein:  
the average signal level operation section performs an operation to obtain an average signal level which is an average level of all the brightness signals each of which is included in the picture signal to be inputted and represents brightness information of each pixel.

Claim 45 (original): The picture signal compensation device as set forth in claim 42, wherein:  
the input signal-output brightness property setting section sets an input signal of brightness-output brightness property which represents variations in brightness of a pixel with respect to a level of the brightness signal in the pixel signal in accordance with the average signal level, and  
the signal compensation section performs compensation of the picture signal so as to satisfy the input signal of brightness-output brightness property thus set.

Claim 46 (original): The image display apparatus as set forth in claim 42, further comprising:  
a delay section for delaying output of the pixel signal of the inputted picture signal to the signal compensation section by time required to perform the operation for the average signal level and to set the input signal-output brightness property.

Claim 47 (canceled)

Claim 48 (previously presented): The picture signal compensation device as set forth in claim 42, wherein:  
the second signal compensation section converts the pixel signal by an inverse function of a function representing the input signal-output brightness property of the display apparatus.

Claim 49 (canceled)

Claim 50 (original): The picture signal compensation device as set forth in claim 42, wherein:



S. Okamoto et al.  
U.S. Serial No. 09/835,194  
Page 10 of 12

the picture signal to be employed in the operation for the average signal level is a color video signal including color component signals of three or more primary colors.

Claims 51-61 (canceled)